

**Amendments to the Claims:**

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) Process for producing an integrally asymmetrical hydrophobic membrane having a sponge-like, open-pored, microporous support structure and a separation layer with a denser structure compared to the support structure, the process comprising at least the steps of:

a) preparing a homogeneous solution from a system comprising 20-90% by weight of a polymer component ~~consisting of~~comprising at least one polyolefin and 80-10% by weight of a solvent for the polymer component, wherein the system at elevated temperatures has a range in which it is present as a homogeneous solution ~~and on cooling has~~ a critical demixing temperature, below the critical demixing temperature in the liquid state of aggregation has a miscibility gap, and has a solidification temperature,

b) rendering the solution to form a shaped object, with first and second surfaces, in a die ~~having at a die~~ temperature above the critical demixing temperature,

c) cooling the shaped object ~~using~~ by contacting the shaped object with a liquid cooling medium that does not dissolve or react chemically with the polymer component at temperatures up to the die temperature, the liquid cooling medium being conditioned to a cooling temperature below the solidification temperature, at such a rate that a thermodynamic non-equilibrium liquid-liquid phase separation into a high-polymer-content phase and a low-polymer-content phase takes place and solidification of the high-polymer-content phase subsequently occurs when the temperature of the shaped object falls below the solidification temperature, and

d) ~~possibly optionally~~ removing the low-polymer-content phase from the shaped object, wherein

~~characterized in that~~ a solvent for the polymer component is selected for which, on cooling at a rate of 1°C/min, the demixing temperature of a solution of 25% by weight of the polymer component in ~~the~~ this solvent is 10 to 70°C above the solidification temperature, ~~and that, for cooling, the shaped object is brought into contact with a liquid cooling medium that does not dissolve or react chemically with the polymer component at temperatures up to the die temperature.~~

2. (Currently Amended) Process for producing a membrane according to claim 1, ~~characterized in that~~ wherein the solvent for the at least one polymer is one for which, for a solution of 25% by weight of the polymer component in ~~the~~ this solvent and a cooling rate of 1°C/min, the critical demixing temperature is 20 to 50°C above the solidification temperature.

3. (Currently Amended) Process for producing a membrane according to claim 1 ~~claim 2~~, wherein ~~characterized in that~~ the solvent for the at least one polymer is one for which, for a solution of 25% by weight of the polymer component in this solvent and a cooling rate of 1°C/min, the critical demixing temperature is 25 to 45°C above the solidification temperature.

4. (Currently Amended) Process for producing a membrane according to claim 1, wherein ~~one or more of Claims 1 to 3~~, ~~characterized in that~~ the polymer component has a density of  $\leq 910 \text{ kg/m}^3$ .

5. (Currently Amended) Process for producing a membrane according to claim 1, wherein ~~one or more of Claims 1 to 4~~, ~~characterized in that~~ the liquid cooling medium is a non-solvent for the polymer component that, on heating up to ~~at the~~ boiling point of the non-solvent, does not dissolve the polymer component to form a homogeneous solution.

6. (Currently Amended) Process for producing a membrane according to claim 1, ~~wherein one or more of Claims 1 to 5, characterized in that the liquid~~ cooling medium is a liquid that is a strong non-solvent for the polymer component and is homogeneously miscible with the solvent at the cooling temperature.

7. (Currently Amended) Process for producing a membrane according to claim 1, ~~wherein one or more of Claims 1 to 6, characterized in that the liquid~~ cooling medium has a temperature that is at least 100°C below the critical demixing temperature.

8. (Currently Amended) Process for producing a membrane according to claim 1, ~~wherein one or more of Claims 1 to 7, characterized in that~~ 30-60% by weight of the polymer component is dissolved in 70-40% by weight of the solvent ~~system~~.

9. (Currently Amended) Process for producing a membrane according to claim 1, ~~wherein one or more of Claims 1 to 8, characterized in that~~ the at least one polyolefin contained in the polymer component consists exclusively of carbon and hydrogen.

10. (Currently Amended) Process for producing a membrane according to claim 9, ~~wherein~~ characterized in that the at least one polyolefin is a poly(4-methyl-1-pentene).

11. (Currently Amended) Process for producing a membrane according to claim 9, ~~wherein~~ characterized in that the at least one polyolefin is a polypropylene.

12. (Currently Amended) Process for producing a membrane according to claim 9, ~~wherein~~ characterized in that the at least one polyolefin is a mixture of a poly(4-methyl-1-pentene) and a polypropylene.

13. (Currently Amended) Process for producing a membrane according to claim 10, ~~wherein the solvent is characterized in that~~ palm nut oil, dibutyl phthalate, dioctyl phthalate, dibenzyl ether, coconut oil, or a mixture thereof ~~is used as the solvent~~.

14. (Currently Amended) Process for producing a membrane according to claim 11, ~~wherein the solvent is characterized in that~~ N,N-bis(2-hydroxyethyl)tallow amine, dioctyl phthalate, or a mixture thereof ~~is used as the solvent~~.

15. (Currently Amended) Process for producing a membrane according to claim 1, ~~wherein the membrane is one or more of Claims 1 to 14 for producing a hollow-fiber membrane~~.

16. (Currently Amended) Hydrophobic integrally asymmetrical membrane made ~~producible~~ by a process according to claim 1, ~~one or more of Claims 1 to 15~~, wherein the membrane consists ~~substantially~~ essentially of at least one polyolefin, has first and second surfaces and an intermediate support layer with a sponge-like, open-pored, microporous structure and adjacent to this support layer on at least one of ~~the~~ its surfaces a separation layer, where the separation layer is dense or has pores with an average diameter < 100 nm, the support layer is free of macrovoids, the pores in the support layer are on average substantially isotropic, and the membrane has a porosity in the range from greater than 30% to less than 75% by volume.

17. (Currently Amended) A gas separation process, comprising contacting a gas to be separated with the membrane made by the process of claim 1 ~~Use of the membrane produced by a process according to one or more of Claims 1 to 15 for gas separation processes~~.

18. (Currently Amended) A gas transfer process, comprising contacting a gas with the membrane made by the process of claim 1 ~~Use of the membrane produced by a process according to one or more of Claims 1 to 15 for gas transfer processes~~.

19. (Currently Amended) An oxygenation of blood process, comprising contacting blood with the membrane made by the process of claim 1~~Use of the membrane produced by a process according to one or more of Claims 1 to 15 for oxygenation of blood.~~

20. (Currently Amended) An oxygenation of blood process, comprising contacting blood with the membrane of claim 16~~Use of the membrane according to claim 16 for oxygenation of blood.~~